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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,514	02/12/2002	John R. Noll	6785-217US	6744

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EXAMINER

PEREZ, JULIO R

ART UNIT	PAPER NUMBER
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2681

DATE MAILED: 08/05/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/074,514

Applicant(s)

NOLL ET AL.

Examiner

Julio R Perez

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7, 8-12, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Evans (6188875) in view of Dam et al. (20010016504).

Regarding claim 1, Evans discloses in a wireless communication system with a plurality of base stations communicating indirectly with a plurality of wireless communications devices through a plurality of repeaters, a method for more efficient use of radio spectrum (col. 3, lines 15-51; Figs. 2-3), comprising: communicating indirectly between a first base station and a wireless communication device using a first repeater and a first RF backhaul link (col. 3, lines 15-24; col. 4, lines 19-50; Figs 1-2, refs. 12, 14, 20, 22, 62,70, the host base station connects to the wireless telephone via the telephone server (16) using the signals 14, 58, 62, 70 as shown on Figure 1 and 2).

Evans does not explicitly disclose controlling a first smart antenna system of said first base station for improved spectral efficiency by selectively configuring said first smart antenna system to spatially isolate communications on said first RF backhaul from communications on a second RF backhaul of a second repeater.

However, the preceding limitation is well known in the art of telecommunications.

Dam et al. teach a system and method to control electromagnetic signals in a radio base station to drive the plurality of beams in order to achieve a great deal of flexibility, which is exploited to improve efficiency and system capacity (page 3, pars. 0031-003).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the system as taught by Evans with an adaptive array smart antenna system and its associated controller because it would provide the system with a combination of an antenna array and a digital signal-processing capability to transmit and receive in an adaptive, spatially sensitive manner. Further, that antenna system is able to automatically change the directionality of its radiation patterns in response to its signal environment, which, in turn can dramatically increase the performance characteristics of the system more efficiently. Moreover, such system is able to minimize interference and maximize intended signal reception and increase gain. In addition, the employment of such antenna system reduces the number of dropped calls, improves call quality and improves channel capacity, hence, improves spectral efficiency. Directing the radio signals to an intended target, in the present case, to a destined repeater, rather than broadcasting throughout the entire cell area accomplishes such improvements.

Regarding claim 2, Evans discloses the method wherein said communicating step further comprises said first base station communicating with a second wireless communication device using said second repeater and said second RF backhaul link

(col. 3, lines 16-42; col. 4, lines 19-50; col. 5, lines 7-45; Figs 1-3, the system includes a number of wireless server systems spread around the different cells).

Regarding claim 3, Evans discloses the method wherein said second repeater communicates with a second base station located in a communication cell separate from said first base station (Fig. 3; col. 5, lines 7-64, the wireless telephone servers may communicate with respective base stations within different cell areas).

Regarding claim 4, Dam et al. teach the method further comprising selectively controlling a second smart antenna system of said second base station for improved spectral efficiency by selectively configuring said second smart antenna system to spatially isolate communications on said second RF backhaul link from communications on said first RF backhaul link (page 3, pars. 0031-003).

Regarding claim 5, Dam et al. teach the method wherein said controlling step further comprises selecting from an antenna array at least one antenna element for use by said first base station in producing a directional antenna pattern having a major lobe in the direction of said first repeater (Page 3, pars. 0032, 0034).

Regarding claim 7, Dam et al. disclose the method wherein said controlling step further comprises selecting a plurality of antenna elements from said antenna array for use by said base station and adjusting at least one of a phase and amplitude of RF signals received and transmitted by said plurality of antenna elements to produce a null in said directional antenna pattern, said null selectively directed toward said second repeater (Page 1, par. 0011).

Regarding claim 8, Evans discloses a wireless communication system with a plurality of base stations communicating indirectly with a plurality of wireless communications devices through a plurality of repeaters, a system for providing more efficient use of radio spectrum (col. 3, lines 15-51; Figs. 2-3), comprising: a first base station configured for communicating indirectly with a wireless communication device using a first repeater and a first RF backhaul link (col. 3, lines 15-24; col. 4, lines 19-50; Figs 1-2, refs. 12, 14, 20, 22, 62, 70, the host base station connects to the wireless telephone via the telephone server (16) using the signals 14, 58, 62, 70 as shown on Figure 1 and 2).

Evans does not explicitly disclose a first smart antenna system operatively associated with said first base station, said first smart antenna system selectively configured by a control processor for spatially isolating communications on said first RF backhaul from communications on a second RF backhaul of a second repeater.

However, the preceding limitation is well known in the art of telecommunications.

Dam et al. teach a system and method to control electromagnetic signals in a radio base station to drive the plurality of beams in order to achieve a great deal of flexibility, which is exploited to improve efficiency and system capacity (page 3, pars. 0031-003).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the system as taught by Evans with an adaptive array smart antenna system and its associated controller because it would provide the system with a combination of an antenna array and a digital signal-

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processing capability to transmit and receive in an adaptive, spatially sensitive manner. Further, that antenna system is able to automatically change the directionality of its radiation patterns in response to its signal environment, which, in turn can dramatically increase the performance characteristics of the system more efficiently. Moreover, such system is able to minimize interference and maximize intended signal reception and increase gain. In addition, the employment of such antenna system reduces the number of dropped calls, improves call quality and improves channel capacity, hence, improves spectral efficiency. Directing the radio signals to an intended target, in the present case, to a destined repeater, rather than broadcasting throughout the entire cell area accomplishes such improvements.

Regarding claim 9, Evans discloses the system wherein said first base station communicates with a second wireless communication device using said second repeater and said second RF backhaul link (col. 3, lines 16-42; col. 4, lines 19-50; col. 5, lines 7-45; Figs 1-3, the system includes a number of wireless server systems spread around the different cells).

Regarding claim 10, Evans discloses the system wherein said second repeater communicates with a second base station located in a communication cell separate from said first base station (Fig. 3; col. 5, lines 7-64, the wireless telephone servers may communicate with respective base stations within different cell areas).

Regarding claim 11, Dam et al. teach the system wherein said second base station comprises a second control processor for selectively controlling a second smart antenna system of said second base station for spatially isolating communications on

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said second RF backhaul link from communications on said first RF backhaul link (page 3, pars. 0031-003).

Regarding claim 12, Dam et al. teach the system wherein said control processor selects from an antenna array at least one antenna element for use by said first base station, and said at least one antenna element produces a directional antenna pattern having a major lobe in the direction of said first repeater (Page 3, pars. 0032, 0034).

Regarding claim 14, Dam et al. disclose the system wherein said control processor selects a plurality of antenna elements from said antenna array for use by said first base station and said first smart antenna system includes phase and amplitude controllers for adjusting at least one of a phase and amplitude of RF signals received and transmitted by said plurality of antenna elements to produce a null in said directional antenna pattern, said null selectively directed toward said second repeater (Page 1, par. 0011).

3. Claims 6, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Evans (6188875) in view of Dam et al. (20010016504) further in view of Xu et al. (6124824).

Regarding claim 6, Evans and Dam et al. teach the limitations in claims 1-5.

Evans and Dam et al. fail to explicitly disclose wherein said controlling step further comprises selecting a plurality of antenna elements from said antenna array for use by said first base station and adjusting at least one of a phase and amplitude of RF signals received and transmitted by said plurality of antenna elements to produce said directional antenna pattern.

However, the preceding limitation is well known in the art of telecommunications.

Xu et al. teach an adaptive antenna array system using digital beamforming, which regulates the gain as well as the phase for each channel element (col. 2, lines 36-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the system as taught by Evans and Dam with an adaptive array smart antenna system because it would provide the system with multiple transmitters coupled to corresponding elements of the antenna array in order to determine the precise power and phase desired signal received on each antenna element and its corresponding receiver as to accomplish an optimum performance of the system.

Regarding claim 13, Evans and Dam et al. teach the limitations in claims 8-12.

Evans and Dam et al. fail to explicitly the control processor selects a plurality of antenna elements from said antenna array for use by said first base station and said first smart antenna system includes phase and amplitude controllers for adjusting at least one of a phase and amplitude of RF signals received and transmitted by said plurality of antenna elements to produce said directional antenna pattern.

However, the preceding limitation is well known in the art of telecommunications.

Xu et al. teach an adaptive antenna array system using digital beamforming, which regulates the gain as well as the phase for each channel element (col. 2, lines 36-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the system as taught by Evans and Dam with an adaptive array smart antenna system because it would provide the system with multiple transmitters coupled to corresponding elements of the antenna array in order to determine the precise power and phase desired signal received on each antenna element and its corresponding receiver as to accomplish an optimum performance of the system.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show the art with respect to mobile communication systems that use smart antennas for more effective use of spectral efficiency.


US Pat. No. 4727590 to Kawano et al.	Communication system with repeater station grid
US Pat. No. 6345188 to Keskitalo et al.	Transmission signal to a mobile unit
US Pat. No. 20030054813 to Riley et al.	Identification of transmitters with limited information
US Pat. No. 6577869 to Garrison	Frequency re-use applications

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5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julio R Perez whose telephone number is (703) 305-8637. The examiner can normally be reached on 7:00 - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on 703-308-4825. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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7/31/04


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